



HYDRAULICALLY ACTUABLE LOCKING DEVICE

The present invention relates to a hydraulically actuatable locking device and has particular reference to a device with two locking pins axially displaceable on one axis.

A disadvantage with known hydraulically actuated locking devices with piston rods acting as the locking components is that the seals present in the device can become prone to leakage due to the locking forces arising.

It would therefore be desirable to overcome this disadvantage.

According to the present invention there is provided a hydraulically actuatable locking element with two locking pins axially displaceable on an axis, characterised by a carrier structure with two slidably guided hydraulic cylinders, the bases of which act as locking pins and have a force-transmitting construction, a centrally fastened common piston rod of the cylinders with a piston fixed at each end, and piston rod fastening means fixedly located centrally and arranged in the structure between the cylinders, the fastening means and the piston rod being provided with ducts for conducting hydraulic fluid.

A locking device embodying the invention may have the advantage that the locking pins, which are provided by base ends of the two axially displaceable, slidably mounted hydraulic cylinders, can transmit locking forces directly to the structure without the participation of seals in this transmission.

In terms of constructional rigidity it is also advantageous that the two axially displaceable hydraulic cylinders have a common stationary piston rod with a respective piston at each of its ends, the rod being rigidly connected preferably at the centre with the structure.

Due to the hydraulic cylinders being contained in the structure, the advantage is achieved that these cylinders are well-protected in the case of rough operation.

The common piston rod and the fastening means preferably each have at least two bores for conducting hydraulic fluid, the fluid thus being conducted centrally. By virtue of the central hydraulic fluid guidance, only two fluid ducts are needed for the actuation of



the locking pins.

If so desired, the common piston rod can comprise two halves. In that case, each half is arranged between and fastened to the piston rod fastening means and a respective one of the pistons.

There are numerous possible uses of the locking device, for example, in bridge laying equipment, i.e. vehicles for laying bridge sections of a collapsible bridge. Bridge sections can be locked on the laying arm of the vehicle by locking devices according to the invention. In the case of hydraulic structures, dam gates can be locked by such devices.

Embodiments of the invention will now be more particularly described, by way of example, with reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation of a first locking device embodying the invention; and

Fig. 2 is a sectional elevation of a second locking device embodying the invention.

Referring now to the drawings there is shown in Fig. 1 a hydraulically actuatable locking device comprising a carrier structure 1 with two hydraulic cylinders 2 and 2' which are slidingly guided on an axis and the mutually remote closed ends or bases of which act as locking pins 3 and 3' and are executed in a force-transmitting construction.

A piston rod fastening 5 is mounted centrally in and rigidly connected to the structure 1 and arranged between the two hydraulic cylinders 2 and 2'.

The two cylinders 2 and 2' have a common piston rod 6 with two pistons 8 and 8' respectively at the two rod ends 7 and 7', the piston 8 being sealingly engaged in the cylinder 2 and the piston 8' sealingly engaged in the cylinder 2'.

The piston rod 6 is fixedly connected at the centre with the fastening 5. The fastening 5 has two bores 9 and 9', and the piston two further bores 10 and 10', for conducting hydraulic fluid to and from hydraulic chambers in the cylinders on either side of the pistons as evident from the course of the bores shown in Fig. 1. Thus, for example, on supply of oil by way of the bore 10 to the mutually remote chambers and return of oil by way of the bore 10'

from the mutually adjacent chambers the locking pins 3 and 3' are driven out of the structure 1 to exert an intended locking function. Reversal of the oil supply to and oil return from the chambers causes retraction of the pins back into the structure.

Fig. 2 shows an embodiment of a hydraulically actuated locking device similar to that of Fig. 1, but with a common piston rod 6 which is composed of two halves 11 and 11'. Each of the halves 11 and 11' is arranged between the piston rod fastening 5 and a respective one of the pistons 8 and 8' and is fixed to the fastening and the respective piston.

CLAIMS

1. A hydraulically actuatable locking device comprising a carrier structure, two hydraulic cylinders which are slidably guided by the carrier structure to be axially displaceable on an axis and mutually remote closed ends of which are formed as force-transmissible locking pins, a piston rod common to the two cylinders and provided at each end thereof with a piston engaged in a respective one of the cylinders, and fastening means arranged in the structure and fastening the piston rod fixedly thereto at a location between the cylinders, the piston rod and the fastening means being provided with ducts for conducting hydraulic fluid.

2. A locking device according to claim 1, wherein the rod comprises two halves, each of which is fixed to the fastening means and a respective one of the pistons.